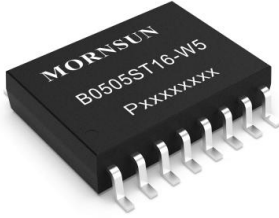


0.5W Isolated DC-DC converter  
Fixed input voltage, regulated single output



## FEATURES

- I/O isolation test voltage 5kVAC, reinforced insulation
- Operating ambient temperature range: -55°C to +125°C
- Adjustable output voltage: 3.3V, 3.7V, 5.0V, 5.4V
- High CMTI: ±150kV/us
- AEC-Q100 approved
- Design to meet IEC62368/UL62368/EN62368
- Design to meet EN60601-1, ANSI/AAMI ES60601-1(2xMOPP)
- SOIC16 package
- Integrated soft-start, over-load protection, over-temperature protection and continuous short-circuit protection

B0505ST16-W5 meets reinforced insulation requirements. It is specially designed for applications where require compact size, high isolation, low isolation capacitor and low leakage current power. It is widely used in medical, electricity, IGBT driver and so on. It is suitable for:

1. Where the voltage of the input power supply is stable (voltage variation: ±10%Vin);
  2. Where isolation is necessary between input and output (isolation voltage ≤5k VAC);
- Such as, medical collection and isolation, High voltage collection circuit, IGBT driven circuits, automobile motor control etc.

## Selection Guide

Certification	Part No.	Input Voltage(VDC)	Output		Full Load Efficiency(%) Min./Typ.	Capacitive Load(uF)
		Nominal (Range)	Voltage* (VDC)	Current (mA) Max./Min.		
--	B0505ST16-W5	5 (4.5-5.5)	3.3	150/15	40/48	1000
			3.7	135/14	40/48	
			5.0	100/10	45/53	
			5.4	92/9	45/53	

Note: \*B0505ST16-W5 adjustable output voltage via Trim pin:  
 1. When Trim is shorted to Vo, the output voltage is 5V;  
 2. When Trim is shorted to Vo through 100kΩ, the output voltage is 5.4V;  
 3. When Trim is shorted to 0V, the output voltage is 3.3V;  
 4. When Trim is shorted to 0V through 100kΩ, the output voltage is 3.7V.

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Input Current (full load / no-load)	5 VDC input	3.3 VDC output	--	208/14	--/20	mA
		3.7 VDC output	--	208/14	--/20	
		5.0 VDC output	--	187/12	--/20	
		5.4 VDC output	--	187/12	--/20	
Hot Plug		Unavailable				
Ctrl	Module on	Connect with high level(2.0-5.5VDC)				
	Module off	Connect GND or float or low-level Voltage(0-0.8VDC)				
	Input current when off	--	--	100	uA	
Input Under-voltage Protection	Under-voltage protection threshold during input rising	--	--	3.0	V	
	Under-voltage protection threshold during input falling	2.1	--	--		
Input Under-voltage Protection	Hysteresis voltage	--	0.2	0.6	V	

### Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Voltage Accuracy	100% load	--	±3	±7	%
Linear Regulation	Input voltage change: ±1%	--	--	±0.2	
Load Regulation	10%-100% load	--	±1	±2	
Ripple & Noise*	20MHz bandwidth, 100% load	--	50	100	mVp-p
Transient Response Deviation	Nominal input voltage, 25% load step change	--	--	100	mV
Transient Recovery Time		--	--	0.5	ms
Thermal shutdown Temp	Junction Temperature	--	165	--	°C
Current Limit		--	220	--	mA
Short-circuit Protection		Continuous, self-recovery			

Note:\* The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

### General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	See Fig.1	-55	--	125	°C
Storage Temperature		-55	--	150	
Storage Humidity	Non-condensing	5	--	95	%RH
Reflow Soldering Temperature*		Peak temp.Tc≤260°C, maximum duration time≤90s over 217°C.			
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1	MSL 3			
Switching Frequency		--	60	--	MHz
MTBF	MIL-HDBK-217F@25°C	36600	--	--	k hours

Note:\* For actual application, please refer to IPC/JEDEC J-STD-020D.1.

### Isolation Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
External Clearance	Measure the shortest space distance from the input to output	8	--	--	mm
External Creepage	Measure the shortest physical distance from the input to output	8	--	--	mm
Maximum working isolation voltage	AC voltage	--	600	--	V <sub>RMS</sub>
	DC voltage	--	849	--	VDC
CMTI	Input(pin1-8) - output(pin9-16), VCM=1200V <sub>RMS</sub>	±100	±150	--	kV/us
Isolation Capacitance	Input(pin1-8) - output(pin9-16) capacitance at 100kHz/0.1V	--	--	3.5	pF
Insulation Resistance	Input(pin1-8) - output(pin9-16) resistance at 500VDC	1000	--	--	GΩ
Isolation Voltage	Input(pin1-8) - output(pin9-16) electric strength test for 1 minute	5000	--	--	VAC

### Mechanical Specifications

Case Material	Black epoxy resin; flame-retardant and heat-resistant
Dimensions	10.3 x 10.3 x 2.5mm
Weight	0.35 g(Typ.)
Junction-to-ambient thermal resistance (RθJA)	83.4 °C/W
Junction-to-case (top) thermal resistance (RθJC <sub>top</sub> )	28.0 °C/W
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig. 3 for recommended circuit)
	RE	CISPR32/EN55032	CLASS B (see Fig. 3 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2	Air ±8kV, contact ±6kV perf. Criteria B

Typical Characteristic Curves

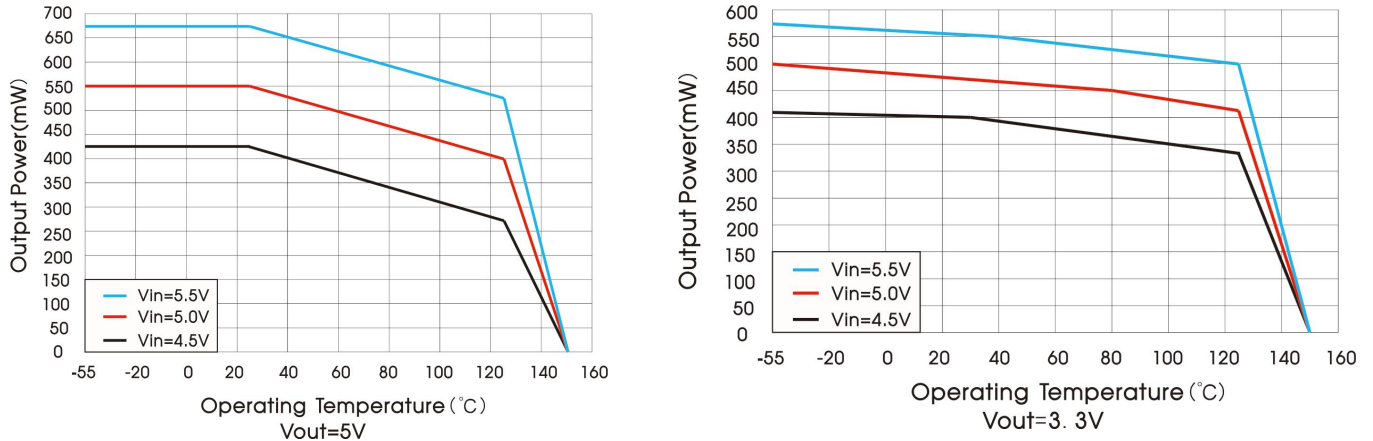
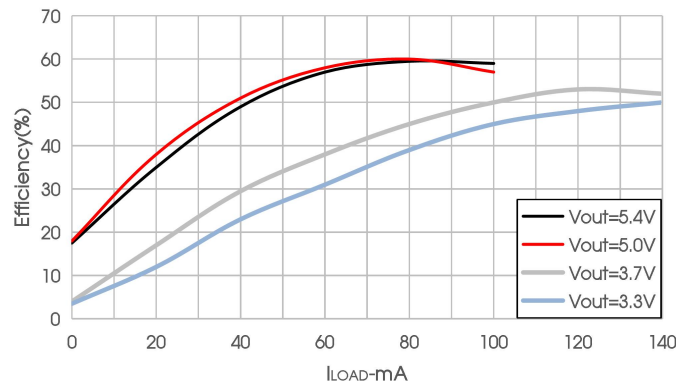


Fig. 1



Design Reference

1. Typical application

Typical application shown in Fig. 2, and Input/Output capacitor(necessary) values shown in Table 1, Trim function table shown in Table 2.

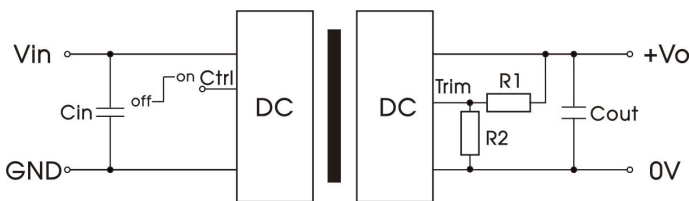


Fig. 2

Table 1: Recommended input and output capacitor values

Cin	Cout
10uF/16V	10uF/16V

Table 2: Trim function table

Trim resistor		Vo
R1	R2	
0Ω	--	5V
100kΩ	--	5.4V
--	0Ω	3.3V
--	100kΩ	3.7V
--	--	Unavailable

2. EMC (CLASS B) compliance circuit

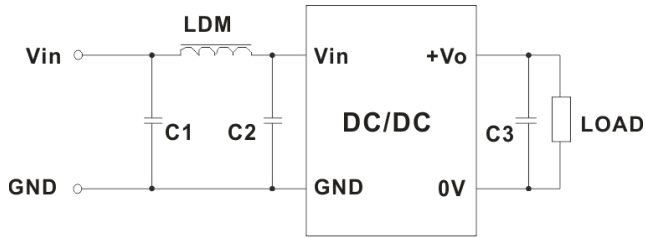


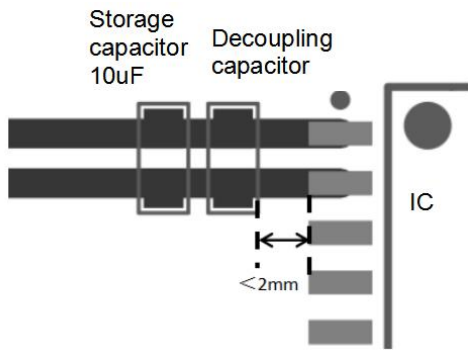
Table 3: Recommended EMC filter values

C1/C2	10uF /16V
C3	Refer to the Cout in Table 1
LDM	6.8uH

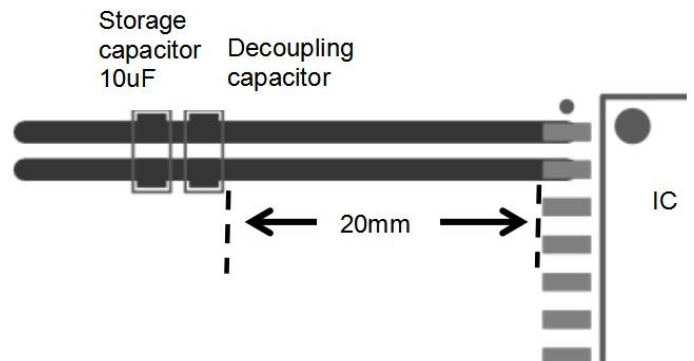
Fig. 3

3. PCB Design Instructions:

3.1 The decoupling capacitors and energy storage capacitors of VIN and GND, VO and 0V should be placed as close to the chip pins as possible to reduce the loop area and the parasitic inductance of PCB traces. Generally, it should be controlled within 2mm. Placing the decoupling capacitor more closer to the chip, as shown below.



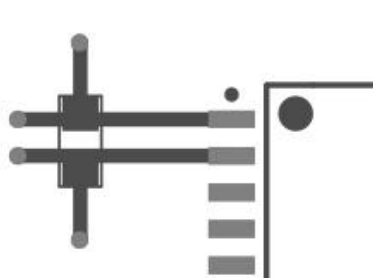
Recommended



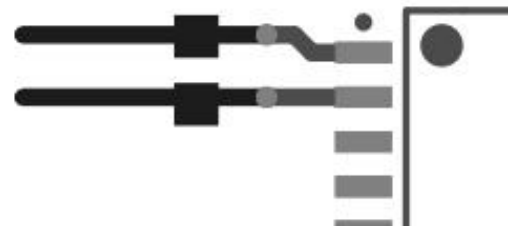
Not recommended

3.2 The power line width should be designed at least 0.5mm when wiring.

3.3 When it is required to place vias in the power supply line and the ground line, the position of the via should be on the outside of the capacitor relative to the chip pins, rather than between the capacitor and the chip, as shown in the figure below, to reduce the parasitic inductance of the via Impact.



Recommended

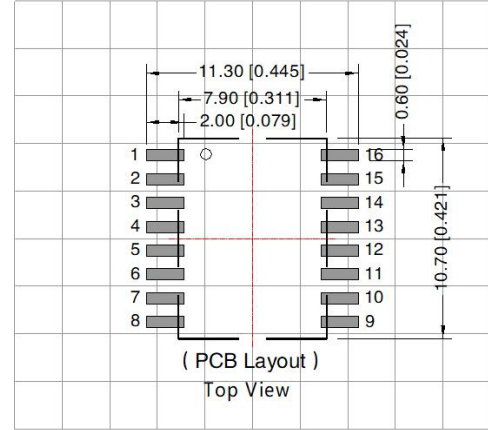
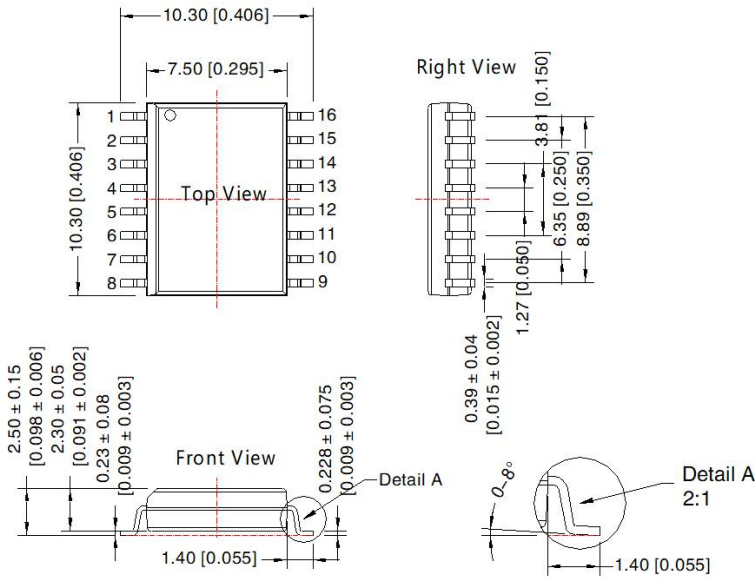


Not recommended

4. For additional information please refer to DC-DC converter application notes on [www.mornsun-power.com](http://www.mornsun-power.com)

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 

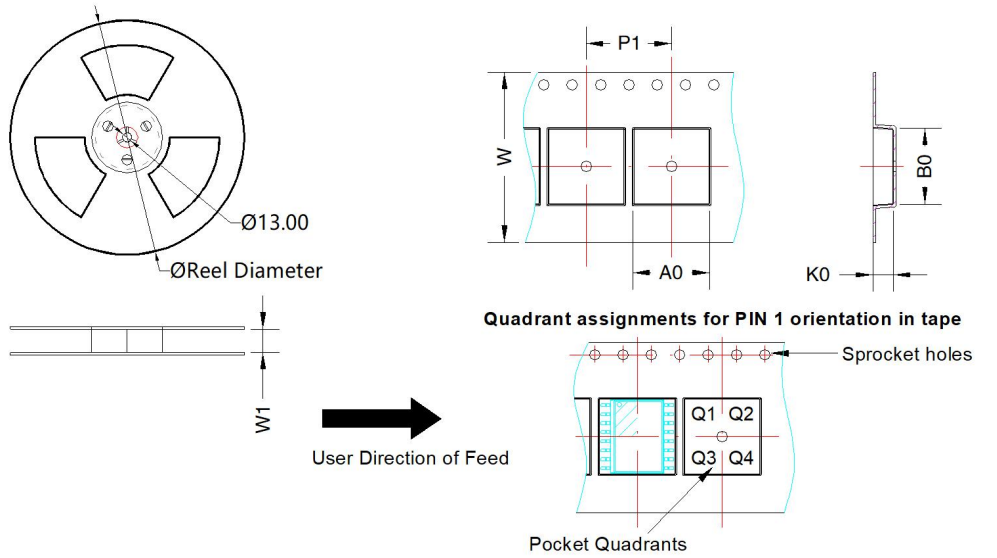


Note: Grid 2.54\*2.54mm

Note:  
Unit: mm[inch]  
General tolerances: ±0.10[±0.004]

Pin-Out			
Pin	Mark	Pin	Mark
1	Ctrl	16	0V
2	GND	15	0V
3	Vin	14	Vo
4	NC	13	Trim
5	NC	12	NC
6	NC	11	NC
7	NC	10	NC
8	NC	9	0V

Tape/Reel packaging



Device	Package Type	Pin	MPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
B0505ST16-W5	SOIC	16	1000	330.0	24.4	10.8	10.7	2.9	12	24.0	Q1

Notes:

1. For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com).
2. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. The maximum capacitive load offered were tested at input voltage range and full load;
4. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity<75%RH with nominal input voltage and rated output load;
5. All index testing methods in this datasheet are based on our company corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

MORNSUN Guangzhou Science & Technology Co., Ltd.

Address: No.5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. China  
 Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: [info@mornsun.cn](mailto:info@mornsun.cn) [www.mornsun-power.com](http://www.mornsun-power.com)